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Gordon R. Groves, Director of Agriculture

STARLINGS IN BERMUDA

Recently, attention has been drawn to the alarming increase of Starlings in Bermuda, and in some circles there has been great concern over a possible future crisis resulting from this increase. In view of the present concern over the problem, I have been asked to submit a general article on the bird for this bulletin. I would like to emphasize immediately that I do not profess to be an authority on Starling control. The observations I can offer on this bird, are merely a part of an overall study of Bermuda's natural history with particular emphasis on the bird life, which I have been carrying on for several years. I do feel, however, that my remarks can be of value in the event that a Government department decides to introduce a programme of control.

The Starling is a medium sized bird, about twice the size of a sparrow, and characterized by a short tail, a long straight bill, and a habit of walking rather than hopping when on the ground. The plumage colour of adults in summer is black with violet and green iridescence, and the bill is yellow. In winter the black plumage is speckled with white, and the bill becomes dark. The young are uniform ashy brown for their first year. In habits, the Starling is very gregarious and noisy, and is generally found in flocks which fly in fast tight formation, feed together in fields and pastures, and gather to roost at night in compact "babbling" groups. It feeds omnivorously on both insects and grains, and in limited numbers would constitute no problem either to agriculture or to urban communities.

Unfortunately, however, in modern times the Starling seldom occurs in limited numbers wherever it is found as a breeding bird. As one of the few species which, like the House Sparrow, has adapted very successfully to man's civilization, it has increased enormously in heavily populated and industrialized countries, especially since the industrial revolution. Further, it has been introduced with civilization to many new parts of the world where it was not formerly found. In this way it was brought to North America. The huge flocks which now occur in many parts of Europe and the New World have constituted a problem by sheer numbers. In the cities, roosting flocks of hundreds

of thousands of Starlings produce an indescribable noise and odour, and disfigure buildings and monuments with their droppings. In the country, vast flocks descending on limited agricultural areas can do a great deal of damage. In Bermuda, such flocks might not only affect agriculture, but could be especially dangerous in urban areas in view of our methods of water catchment.

The nesting habits of the Starling are very similar to those of the House Sparrow. They readily nest in the chinks of houses and other man-made structures, and in rural areas prefer hollow trees. Thus, apart from an added headache to houseowners, their establishment in Bermuda means that the hole-nesting Bluebird has to face another competitor for nest sites in addition to the House Sparrow. The Bluebird, already seriously depleted by competition with the House Sparrow, may suffer a further decline or die out altogether if the Starling becomes abundant.

Having discussed the Starling's habits and its potential effects (if increasing to large numbers), in Bermuda, I will now relate the stages of its establishment and increase here. Unlike the House Sparrow which was deliberately introduced about 1875, the Starling colonized naturally on its own. This natural colonization can, however, be indirectly related to the activities of man. In the first place, its occurrence here is a result of its deliberate introduction into North America. Soon after it became established there, vagrants began to be driven to Bermuda by storms. For many years the occasional migrant individuals or flocks departed from the Island again without any idea of breeding here, apparently because ecological conditions at that time were unsuitable for their establishment. It was only after the destruction of the Bermuda cedar forest by 1951 that Starlings began to stay over the summer. In 1954 the first record of breeding birds was made. At about the same time the Mourning Dove became established in Bermuda, and together with the Starling, began a steady increase and spread over the Island. The establishment of these two species is now considered to have been made possible by the opening up of suitable niches due to the loss of the cedar forest. Both species prefer open areas, scrubby vegetation in the case of the Mourning Dove, and agricultural, pasture, or lawn areas in the case of the Starling. It is noteworthy that the initial colonies of Starlings in Bermuda grew in the vicinity of extensive lawn areas such as Kindley Air Force Base and Camden in Paget, or cow pastures and agricultural land.

When I returned from Cornell University in 1957, the Starling had already become well established in three localities, numbering perhaps 200 birds. Fearing the consequences of their increase, and hoping to control them while they were still limited in numbers, I endeavoured to eliminate them by shooting, being at the time the only person properly equipped to do so. More than 100 were killed before 1959, but it was quite evident by then that I was losing ground. The reproductive potential proved to be enormous, with single pairs capable of rearing two and three broods of five young each in a year. By 1959 there were probably close to 800 breeding Starlings in six localities. At the present time there may be 4,000, and the species is virtually island wide though still scarce in most areas. This figure is still low compared to the estimate of between 100,000 and 400,000 House Sparrows, but it is clear from the trend that Starling is still continuing an explosive increase. To have eliminated it after 1960 by shooting and nest destroyal would have been doubtful, even if one

man worked full time on this project alone. Certainly, the mere enlistment of public support, in controlling this species, will have no effect on its population trends.

This brings us up to the present period when Starlings are beginning to attract public notice and arouse official concern. The primary question at present is whether the Starling will continue to increase and only reach a balance at a population high enough to constitute a really serious problem of watercatchment pollution, or whether it will simply become another minor nuisance like the House Sparrow. In other words, is a serious Government sponsored campaign of elimination economically warranted? Unfortunately, it is impossible to tell just how high the Starling population will go because ecological conditions are very different here from those of the areas where Starlings constitute a real problem. The species may fare better or worse, and no-one yet knows enough about ecology to predict this accurately. If the Starling only trebles its present population before levelling off, and if it continues to select rural areas for roosting at night as it does now, I would venture to say that it will not be a threat to water pollution. If it multiplies beyond this point, as it might if it displaces the House Sparrow in urban areas, then I would definitely say we are in for trouble. In either case, it is very likely to become a minor agricultural pest, and will undoubtedly be a widespread nuisance to houseowners by nesting in eaves. It may well cause the extirpation of the Bluebird as well.

Dealing now specifically with the problem of control, I would like to stress that the only satisfactory and economically worthwhile control would be complete elimination. Any effort made, therefore, should be directed towards this goal. For this reason, the mere establishment of a bounty and enlistment of public support in Starling destruction is not enough. This must be accompanied by a scientifically conceived programme directed by a person or persons having a knowledge of the bird and its habits. The purpose of such a programme would be to exploit any vulnerable features of the Starling's ecology or life history. Fortunately, unlike the House Sparrow, which is beyond any economically feasible means of control, the Starling has one significantly vulnerable feature. This is its habit of congregating in large flocks to feed and roost. During the winter months the entire population of Bermuda congregates into about six separate flocks which use the same roosts night after night and feed in the same general areas each day. Although experience has often taught us that complete elimination of any pest is usually impossible, I do feel that this one vulnerable feature of the Starling combined with an early and scientific programme of elimination does give us a much better chance.

DAVID B. WINGATE.

PLANTSMAN'S CHOICE

CLEOME SPINOSA

"Spider Flower"

Our plantsman's choice for this month, Cleome Spinosa, bears a common name which does not really fully or adequately describe the plant.

The cleome belongs to the family, CAPPARIDACEAE, and is native to Tropical America.

Botanically, it can be best described as an annual, capable of obtaining a height of 4 feet, with a pubescent and erect stem with palmate leaves. As the specific name Spinosa suggests, the plant has its own defence in the form of short spines, which are to be found on both the stem and leaves.

The flowers are borne on erect stems above foliage level. Their colour, due to hybridising, may be white, purple or rose. It is the lone stamens which grow out well beyond the petals that have given the name of Spider Flower to the plant.

The stem and foliage give off a pungent smell which would not readily capture the imagination of a lady who is fond of perfumes. This factor, however, should not deter a seeker of new and worthy plants.

I have not seen this plant growing in Bermuda, outside of the nursery, but Britton does draw reference to it in his "Flora of Bermuda." He says, and I quote, "as a common weed in warm countries it may be expected to be introduced at any time." That was in 1918 — and it does not bear the distinctive claim of being a common weed as yet.

It is likely that it will escape from cultivation, but should this happen it would be quite beneficial. Its value as an attractive addition to our wild flora would compensate for any weed problem.

The plant in question may be viewed in the Formal Garden at the Botanical Gardens. It is featured as a specimen planting in the centre of the main beds.

It is easily raised from seed, which is obtainable from most good seedsmen.

For the finest results it should be sown where it is to flower, and thinned out later. Alternatively, it may be sown in pots, transferring to the beds when large enough to handle with ease.

Pots made of compressed peat moss are commercially available today, and can be obtained in Bermuda. They are excellent for use with bedding plants, as the pot may be planted in the beds as well, thus preventing any root disturbance. The pots rapidly decompose in the soil, and add a little organic matter to it.

The Cleome does not take kindly to transplanting due to its tapering root system, which causes an excessive wilting of the foliage.

It is not over-exacting in soil requirements, growing well in any well managed flower bed. A sunny position is to be preferred. Our plants were raised from seed sown in pots during last May.

Experience will reveal, I think, that this plant may be used equally as well in both Spring and Summer.

It provides a useful extension to our range of bedding plants.

DONALD J. MOORE,
Superintendent,
Bermuda Botanical Gardens.

GARDEN CALENDAR FOR AUGUST

The rainfall experienced in July, whilst proving to be favourable in many ways to optimum plant growth has also brought along its own set of problems.

One of these problems has been the high rate of weed growth, high, that is, for this time of the year.

Whilst the old saying, "If weeds won't grow there, nothing will," has a lot of truth in it, the subject should be investigated a little deeper.

Quite apart from the untidy appearance of a garden smothered in weeds, other factors arise and cannot be ignored.

Weeds compete with other plants for soil fertility. Heavy weed growth can quickly absorb most of the available plant food in the soil, at the expense of your crop. Soil moisture is rapidly absorbed also.

Many weeds may act as alternative host plants for pests which attack your vegetables and ornamentals. Whilst you may diligently spray a particular favourite plant or crop against a particular pest or disease infection, weeds nearby may harbour that same pest, thus allowing a quick re-infection soon after spraying. There are cases where virus diseases may also be carried over on a particular species or group of weeds, ready to re-infect a cultivated crop.

When new seed beds are made or seedling stock planted out, weed-growth if left unchecked, will quickly smother the seedlings, resulting in a substantial if not a complete loss of crop. Any seedlings left are invariably weak and drawn as a result of the competitive growth around them. They will never give of their best after this.

Finally, if weed growth can be kept to a minimum and is not allowed to mature thereby flowering and seeding, then the problem of reinfestation is greatly reduced.

Where Poinsettias are being grown in pots or cans for Christmas decoration, then it is time some attention was given to cultivation. Where growth is vigorous, pruning back must be carried out. This entails nipping out the ends of shoots, some 2 to 4 inches back from their apex, dependent upon the overall size of the plant. More spacing between cans will allow for greater individual development and healthier plants. If the foliage is yellowing and showing signs of starvation then application of a proprietary liquid organic fertilizer should correct this trouble. Apply this according to the makers' instructions.

Now is the time to plan out your winter bedding schemes and decide what annual flowers you will be requiring for sowing from September onwards. There are many new varieties of Petunias, Snapdragons, Phlox and other popular subjects available today. The F.I. hybrid strains, although expensive are often worth that extra outlay. Consult your seedsman early thereby avoiding any disappointment or delays.

DONALD J. MOORE,
Superintendent,
Bermuda Botanical Gardens.

THE HOME PROPAGATOR

Cuttings taken now of Abelia Grandiflora, will provide young plants for putting out this coming Fall.

Firm ripe wood of pencil thickness should be selected, and all soft immature wood avoided.

Cuttings should be made from 6-8 inches long, cutting just below a leaf joint and just above. Removal of any sideshoots is advised.

The cuttings should be planted in a rooting medium consisting of either a good sandy garden soil or in a Peat-Perlite combination. Perlite is an inert, sterile medium, ideally suited to the rooting of cuttings. It should be obtainable from most garden merchants. For finest results use two parts Perlite to one part of Peat Moss.

The cuttings should be inserted with as little delay as possible after preparation. They should be planted 3"-4" deep in the rooting medium.

When planting in sandy soil, it will be necessary to firm the cuttings in well prior to watering. When planting in a Peat/Perlite combination, firming is difficult due to the light springy texture of the medium. The initial watering-in will firm the cuttings, however.

The cuttings may be planted in boxes, pots, or in a prepared bed, the latter being preferable.

This bed may be in a slat house or in a section of the garden which is open, yet sheltered from fierce sun or wind, and with protection against heavy rainfall.

Attention prior to rooting, will entail careful light watering. This need only be sufficient to keep the medium moist, but not saturated. Protection against domestic animals, frogs and snails, will be necessary also.

A stimulation in top growth normally indicates rooting. Do not, however, remove the cuttings from the bed until they have developed a reasonable root system.

Occasionally, heavy top growth will be made without rooting becoming apparent. When this occurs, pinch out the tops, thus throwing stimulus back into the base of the cutting.

Pot up the rooted cuttings into a good soil in pots or cans and grow on until large enough to plant out.

This propagation routine applies not only to Abelia, but to many garden shrubs, including Barleria, Buddleia, Box-wood, Natal Plum, Arabian Tea, Prickly Myrtle, Croton, Blue Sage, Elaeagnus, Hibiscus, Rose of Sharon, Chinese Hat Plant, Queen of Shrubs, Lantana, Privet, Plumbago, West Indian Elder, Viburnum and Vitex.

Further articles on home propagation will appear in this bulletin.

D. J. M.

THE BULLDOZER

In the May issue of the Agricultural Bulletin, Vol. XXXI, No. 5, a short article was published on the "Bulldozer". Shortly after the publication of this bulletin a very interesting letter was received from Nova Scotia, which, with the writer's permission, is reproduced below.

Nova Scotia

Department of Agriculture and Marketing,

Halifax, Nova Scotia,

June 20, 1991.

Mr. Gordon R. Groves,
Director of Agriculture,
Bermuda Department of Agriculture,
Hamilton, Bermuda.

Dear Mr. Groves:

It seems that the problem of how to control bulldozer operators is the same the world over. I was particularly struck by your observation in the May issue of the Agricultural Bulletin, in which you suggested that a bulldozer, improperly used, can be a devastating machine.

This is very true and it appears that you have the same problems in Bermuda as we have here. Give a man a bulldozer and he feels he has not done a good job unless he clears away everything.

A year ago we purchased a house, but we were not able to occupy it for a couple of months, until the previous owners moved. About a month after purchasing it, Mrs. Macleod motored out one day to see it, and she was very distressed to find that the lot next to ours, which had been covered with pine, birch, and spruce trees, had been denuded of forest growth because of plans to build a house on it. Instead of just clearing off enough space for the new house and letting the new owner decide which trees should be moved, the bulldozer operator cleared off everything. Even on our own property, a great many trees which might well have remained, were removed. Now we are trying to reforest the area — something that can't be done in two generations.

I sincerely trust that your efforts to make people conscious of the importance of maintaining vegetation and retaining valuable top soil meets with the success it deserves. It is a tragedy that such valuable natural resources are thrown away instead of being treasured.

Yours very truly,

(Signed) W. J. MACLEOD,

Director of Services.

ORNAMENTAL FLOWERING VINES

Wider use can be made of ornamental flowering vines in Bermuda. There is a great variety in time of blooming, colour, size and general appearance of both flowers and foliage. Here are a few of the many uses:

(a) Ornamental vines are often needed for covering the walls of buildings, for the close clinging species accentuate pleasing architectural lines, while the dense growing kinds will soften or obliterate undesirable features.

(b) Vines can be used in confined situations, narrow spaces and passageways which are difficult to fill with a shrub.

(c) Walls, fences, dead cedar trees, poles and posts, can be transformed into pleasing spectacles, by the careful use of vines.

(d) Vines, when well selected, can be used to give contrast and character to landscape plantings, and will help to create a tropical effect.

Several factors should be considered when choosing the material. For instance, thought should be given to (a) is the plant deciduous or evergreen; (b) will the texture of the foliage, the colour of the flowers and the time of

blooming harmonise with the immediate surroundings; (c) is the plant easy to maintain in a given space. (This is especially important because many climbing plants are vigorous growers, and will soon fill their allotted space and encroach on their neighbours,) and (d) will the matured vine suit the proportions of the building on which it is to climb?

Annotated list of ornamental vines

Bougainvillea - Bougainvillea spp. - various colours - spring and summer.
Flame vine - Prostegia ignea - bright orange flowers; mid-winter.
Allamanda - Allamanda cathartica - yellow - summer months.
Jasmine - Jasminum spp. - White and yellow; flowering season depends on the species.
Cape-honeysuckle - Tecomaria capensis - orange red flowers; most of the year.
Queen's wreath - Petrea volubilis - mauve to blue; flowers during spring and summer.
Bugle Chalice Vine - Solandra longiflora - yellow or cream; flowers during late summer and early autumn.
Costa Rican Nightshade or Potato Vine - Solanum wendlandi - lilac-blue; flowers during spring and summer.
Brazilian Nightshade - Solanum seaforthianum - light purple; flowers during early spring.
Blue Sky Vine - Thurbergia grandiflora - blue; flowers during summer and autumn. There is also a white flowered form.
Wisteria - Wisteria sinensis - blue to violet, pea shaped flowers produced during March and early April.
Clematis - Clematis flammola - the small, fragrant white flowers appear in late summer.
Trumpet Vine - Campsis radicans - flowers orange with scarlet limb, var. flava orange yellow.
Japanese Honeysuckle - Lonicera japonica - white tinged with purple, changing to yellow with age.
Trumpet Honeysuckle - Lonicera sempervirens - coral or scarlet flowers produced during spring and summer.

J. HUBERT JONES,
Horticulturist.

WEATHER RECORDING STATION AT BOTANICAL GARDENS

Summary of Climatological data obtained at the Botanical Gardens during July, 1961

Mean maximum temperature 84.4
Mean minimum temperature 74.3
Mean monthly temperature 79.3
Absolute maximum 87.2 on July 21st
Absolute minimum 66.6 on July 3rd
Rainfall 3.45 inches
No. of rain days 9